THE BODY SIZE DISTRIBUTION OF CHOSEN SPECIES OF ROTIFERA IN DIFFERENT TYPES OF SMALL WATER BODIES IN THE WIELKOPOLSKA REGION

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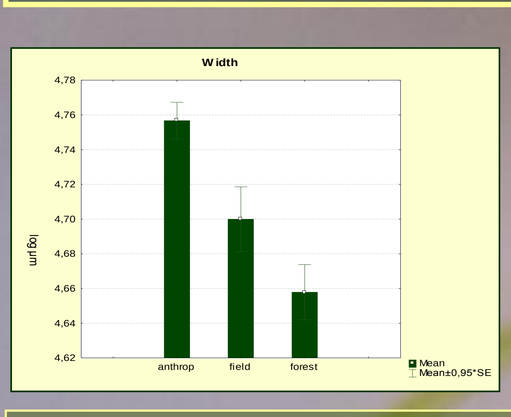
Introduction

Small water bodies are often characterized by specific macrophyte species composition and different levels of predation and this may also have an effect on the body length and shape of rotifer specimens.

The main aim of study was to determine the relation of rotifers representing different body size, towards specific kinds of pond (mid-forest, pastoral and man-made) and to three kinds of hydromactophytes (nymphaeids, elodeids and helophytes) as well as comparatively to the open water zone. Two species of a wide range of distribution in various ecological habitats were chosen for this analysis *Brachionus angularis* (Fot. 1) and *Keratella quadrata* (Fot. 2). The examined water bodies differed in respect to fish presence.



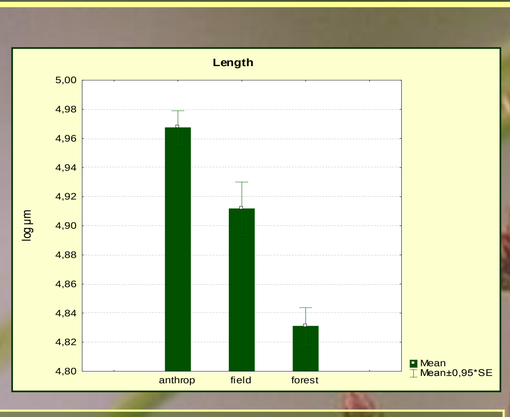
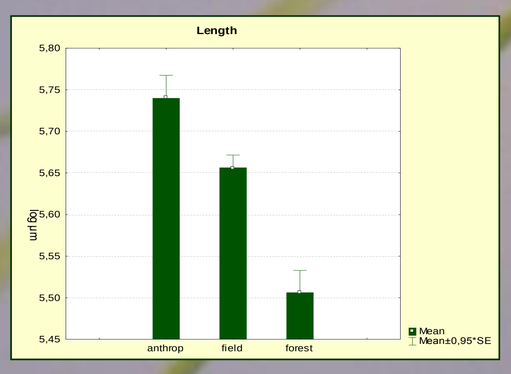


Fig.1. The body size of Brachionus angularis in different types of water bodies.



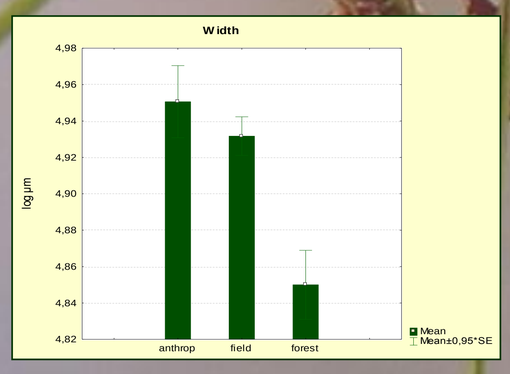


Fig. 2. The body size of *Keratella quadrata* in different types of water bodies.

Material and Methods

The field examination was performed on 13 water bodies in Wielkopolska Region. Catchment area type, aquatic vegetation as well as predation pressure differed between particular ponds (Tab. 1). The water bodies were classified into three groups, depending on character of the surrounding area: forest, field and anthropogenically modified, situated in urban places. Samples were taken in the summer period in triplicate at each site from homogenic plant stands or surface water stations.

A plexiglass core sampler was used to sample the macrophyte-dominated stations. The collected material was concentrated using a 45-µm plankton net and was fixed immediately with 4% formalin.

Rotifera specimens were measured at longest and the broadest parts of the animal body at least 30 specimens were measured in each sample. More than 300 individuals from each species were measured altogether. The top spines of *Keratella quadrata* were not included in the measurements.

The analysis of variance (ANOVA) was used to identify the differences in the body size of individuals of rotifer species between particular kinds of habitats, including hydromacrophytes and the open water zone and also between particular types of water bodies (N_{Ba}=330, N_{Kq}=301).

Tab. 1. The catchment area type, presence of fish and the stations of the examined water bodies.

	POND	CATCHMENT AREA	FISH PRESENCE	STATION
1	BATOROWO	ANTROPOGENIC	ABSENT	WATER
				PHRAGMITES AUSTRALIS
2	DĄBRÓWKA	FIELD	PRESENT	*PHRAGMITES AUSTRALIS*
				POTAMOGETON PECTINATUS
3	GAZBRUCHY	FOREST	ABSENT	*POA ANNUA*
4	GAZBRUCHY M	FOREST	ABSENT	WATER
5	GAZBRUCHY W	FOREST	ABSENT	*SCHOENOPLECTUS LACUSTRIS*
				POTAMOGETON LUCENS
6	HINDAK	FOREST	ABSENT	WATER
7	KLEMPICZ	ANTROPOGENIC	PRESENT	WATER
				POTAMOGETON NATANS
				TYPHA ANGUSTIFOLIA
8	KRAJ WARTY	FOREST	ABSENT	WATER
9	MARCELIN	ANTROPOGENIC	PRESENT	*PHRAGMITES AUSTRALIS*
10	MIŁKOWO	FOREST	ABSENT	WATER
11	PALĘDZIE	FIELD	PRESENT	WATER
				POTAMOGETON LUCENS
12	SW JERZY	FIELD	PRESENT	WATER
13	TP 21	FIELD	ABSENT	WATER

Results and Conclusions

Morphometrical analysis of specimens of *Brachionus angularis* showed that both the type of water body relating to different land use as well as microhabitat type significantly influenced its size. The individuals of this species were significantly larger (including both length and breadth) in anthropogenically modified water bodies while the smallest ones were noted in samples from mid-forest reservoirs (Fig. 1). Similar differences in body size relating to the catchment area type were also recorded in the case of *Keratella quadrata* (Fig. 2).

The increase in the body size of these rotifer individuals may be a consequence of the intense biogen supply in the anthropogenically modified water bodies, which causes on increase of primary production and therefore creates favourable food conditions for those two species, which are indicators of eutrophic conditions.

Considering the different type of habitat (irrespective of pond) the smallest specimens of *Brachionus angularis* were found in samples from helophytes, medium sized specimens from among elodeids and the largest were obtained from the open water samples (Fig. 3). *Keratella quadrata* specimens were also largest in the open water zone but the smallest individuals were found among elodeides (fig. 4). Both analyzed rotifer species are described as pelagic forms and therefore they might have found most favourable conditions among the open water sites. Limnetic species may easily live in the pelagic zone, where predation pressure is strongest, by evolving mechanisms which reduce their vulnerability. Hence they often evolve spines the length of which is positively correlated to predation pressure, so the largest specimens of *Keratella quadrata* were found in the open water area. This kind of species may also change their body size in respect to predator pressure and therefore both *Brachionus angularis* and *Keratella quadrata* were found to be largest in the non-vegetated zone.

To sum up the morphometrical analysis of specimens of *Brachionus angularis* and *Keratella quadrata* species showed that both the type of water body relating to different land use as well as microhabitat type significantly influenced their size.

Fig. 3. The body size of Brachionus angularis in different types of ecologic habitat.

Fig. 4. The body size of *Keratella quadrata* in different types of ecological habitat

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